

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ROBERT WINSTON NOWLIN
and SETH SUPPAPPOLA

Appeal 2009-0846
Application 10/645,360
Technology Center 2600

Decided:¹ March 16, 2009

Before KENNETH W. HAIRSTON, MARC S. HOFF,
and KARL D. EASTHOM, *Administrative Patent Judges*.

HAIRSTON, *Administrative Patent Judge*.

DECISION ON APPEAL

¹ The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the decided date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

STATEMENT OF THE CASE

Appellants seek our review under 35 U.S.C. § 134 from the Examiner's final rejection of claims 1 to 10. We have jurisdiction under 35 U.S.C. § 6(b).

We reverse.

The Invention

Appellants' invention is directed to a cellular telephone and a method for providing a comfort noise signal in the telephone, the telephone having a plurality of sub-band filters, the method including generating a white noise signal and using a QMF filter bank to control the magnitude of white noise in each QMF filter according to the sub-band filtered signal.²

Claim 1 is representative of the claims on appeal, and read as follows:

1. A method for providing a comfort noise signal in a telephone having a receive channel and a transmit channel and a plurality of sub-band filters in at least one channel, said method comprising the steps of:

generating a white noise signal;

applying the white noise signal to a QMF filter bank to produce a comfort noise signal, wherein the magnitude of the white noise into each QMF filter is controlled in accordance with the magnitude of the signal in a corresponding sub-band in the one channel; and

selectively coupling the comfort noise signal to at least one of the channels. (Emphasis added).

² See generally Abstract; Spec. 2; Figs. 3-5; claims 1 and 6.

The Applied Prior Art

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Swaminathan	US 5,630,016	May 13, 1997
Uchino	US 2003/0063662 A1	Apr. 3, 2003

The Rejection

The Examiner rejected claims 1 to 10 under 35 U.S.C. § 103(a) as being unpatentable based on the teachings and suggestions of Swaminathan and Uchino.

ISSUE

Appellants' independent claims 1 and 6 each recite the feature of using a QMF filter bank to filter plural sub-band filtered signals in order to produce a comfort noise signal (hereinafter, "the QMF feature") (*see infra* Finding of Fact 2). Dependent claims 2 to 5 depend from claim 1, and dependent claims 7 to 10 depend from claim 6. Thus, each of claims 1 to 10 on appeal recites the noted QMF feature.

The Examiner rejected claims 1 to 10 over the combination of Swaminathan and Uchino. The Examiner relied upon Swaminathan as showing the basic features of a digital cellular telephone including a comfort noise generator, and relied upon Uchino as teaching (i) a white noise generator, and (ii) a quadrature mirror filter (QMF) bank for filtering multiple frequency sub-bands filtered by multiple sub-band filters where the magnitude of white noise in each QMF is controlled according to the magnitude of the signal in each sub-band (Ans. 3-6).

With regard to the QMF feature of claims 1 to 10 (*see generally* claim 1, emphasized portion, *supra*), the Examiner states:

... it would be obvious to one of ordinary skill in the art at the time of the applicant[s']^[sic] invention to apply Uchino et al.'s method of generating noise in the telephone of Swaminathan et al. *in order to generate a noise signal that fluctuates along the power spectrum density distribution characteristic of the frequency fluctuations of the receive or transmit channel.*

(Ans. 4 and 6, citing para. 0478 of Uchino) (emphasis added).

Appellants contend that Swaminathan and Uchino are unrelated and that there is no basis for making the combination (Br. 4 and 7). Appellants assert that the references are unrelated because Uchino is directed to testing using a white noise signal, while Swaminathan and Appellants' inventions are directed to digital cellular telephones with comfort noise generators (Br. 4-6).

Accordingly, the issue is: Have Appellants established that the Examiner has not presented a rational basis for combining the digital communication system of Swaminathan with the test signal method and apparatus of Uchino?

Rather than repeat the arguments of Appellants or the Examiner, we refer to the Brief and the Answer for their respective details.³

³ We refer to the Appeal Brief (Br.) filed June 4, 2007, and the Examiner's Answer (Ans.) mailed September 10, 2007, throughout this opinion.

FINDINGS OF FACT

The findings of fact (FF) throughout this decision are supported by a preponderance of the evidence of record. The following facts are pertinent to the issue before us.

Appellants' Disclosure

1. Appellants describe and claim a digital cellular telephone 22 (Fig. 3 and 4) and a method for providing a comfort noise signal in the telephone 22, the telephone 22 having plural sub-band filters 54 (Abstract). The method includes generating a white noise signal and using a QMF filter bank 77 (*see* Fig. 6) to control the magnitude of white noise in each QMF filter 90-99 (*see* Fig. 8) according to the sub-band filtered signal (*see generally* Spec. 2; Figs. 3-8; claim 1).

2. Independent claims 1 and 6 each recite the common limitation of using a QMF filter bank to filter plural sub-band filtered signals in order to produce a comfort noise signal (*see* claims 1 and 6).

3. Appellants disclose that there is a need in the art to use comfort noise in a telephone or other voice communications device to suppress residual echo, while at the same time generate an improved comfort noise that matches actual background noise and has a more natural sound (*i.e.*, avoids apparent loudness changes during conversation) (Spec. 1-2).

4. Appellants' invention produces comfort noise which "more closely matches the spectral content of actual noise during a call," and does this "by shaping white noise in a M channel quadrature mirror filter bank in accordance with the amplitude of the actual noise" (Spec. 10).

Uchino

5. Uchino discloses a method and apparatus 20 for generating a test signal to test the response of a digital line 1 (Fig. 1, 5, 22-24 and 26-28). The test signal is generated with a wander generator 21 based on a random number signal and a clock signal, and is combined with a white noise signal n1-n13 and then filtered by a QMF filter bank 56/57 (Abs.; Fig. 1; para. 0472). Uchino teaches dividing the signal into plural sub-bands in order to perform weighted processing on the signal, and then filtering the signal using the QMF filter bank in accordance with weighting coefficients which determine the spectrum characteristic of the output signal (paras. 0478 and 0490). The weighting coefficients are fixed and are set by the "characteristic information setting means" (para. 0457). The weighting coefficients are set according to testing parameters such as time interval error which accounts for wander and jitter at certain frequencies (paras. 0007, 0008-0014, 0019, and 0025-0027).

6. Uchino fails to teach testing a line during a phone call, during cellular phone operation, or in any type of communication where there is a variable signal such as voice, speech, or conversation. Uchino also fails to teach using a QMF filter bank to process a voice signal in a cellular digital telephone such that the amplitude of white noise is varied in accordance with the amplitude of a variable (*i.e.*, speech) signal.

Swaminathan

7. Swaminathan teaches a digital cellular telephone system (Figs. 1 and 2) and a method for providing a comfort noise signal in the telephone using a comfort noise generator 76 (Abs.; col. 1, ll. 14-19). Swaminathan's comfort noise generator 76 operates to generate a comfort noise which is

based on a spectrally flattened background noise (*see* Fig. 3; col. 5, l. 30 to col. 6, l. 11). Although Swaminathan discloses using an infinite impulse response filter to filter the generated noise, and normalizing delayed samples over time, there is no disclosure of dividing an input signal into plural sub-bands for different processing based on input signal amplitude (*see* col. 3, ll. 41-64). The weighting factors (“a” and “1-a”) are not based on frequency bands (col. 3, l. 66 to col. 4, l. 7). Likewise there is no teaching in Swaminathan of using a QMF filter bank to process the spectrally flat background noise signal.

PRINCIPLES OF LAW

"In rejecting claims under 35 U.S.C. § 103, the examiner bears the initial burden of presenting a *prima facie* case of obviousness." *In re Rijckaert*, 9 F.3d 1531, 1532 (Fed. Cir. 1993) (citing *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992)).

"A *prima facie* case of obviousness is established when the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art." *In re Bell*, 991 F.2d 781, 783 (Fed. Cir. 1993) (quoting *In re Rinehart*, 531 F.2d 1048, 1051 (CCPA 1976)).

"Section 103 forbids issuance of a patent when 'the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.'" *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1734 (2007) (citation omitted). The Examiner's "articulated reasoning . . .

in the rejection must possess a rational underpinning to support the legal conclusion of obviousness.” *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). The Supreme Court, citing *Kahn*, 441 F.3d at 988, stated that “rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR*, 127 S. Ct. at 1741.

When combining references to show non-obviousness under § 103, the Examiner must satisfy a two-prong test for analogous art, as set forth by the Federal Circuit in *In re Kahn*, 441 F.3d 977:

The analogous-art test requires that the Board show that a reference is either [1] in the field of the applicant’s endeavor *or* [2] is reasonably pertinent to the problem with which the inventor was concerned in order to rely on that reference as a basis for rejection. References are selected as being reasonably pertinent to the problem based on the judgment of a person having ordinary skill in the art.

Kahn, 441 F.3d at 986-87 (emphasis added) (internal citations omitted).

Appellants have the burden on appeal to the Board to demonstrate an error in the Examiner's position. *See Kahn*, 441 F.3d at 985-86.

ANALYSIS

Appellants’ argument that Uchino is unrelated to the method and apparatus claimed, and thus is non-analogous art (Br. 6), is convincing. The

two-step test for determining whether a reference is analogous art (set forth in *Kahn, supra*) is not met.

We agree with Appellants that (1) Uchino is directed to generating a test signal (and is thus unrelated to Appellants' claimed invention) (Br. 5-6), and (2) that Uchino is not reasonably pertinent to the problem faced by Appellants of providing comfort noise in a digital cellular telephone environment while matching actual background noise, the same problem with which Swaminathan was concerned (*see generally* Br. 7-8). *Kahn*, 441 F.3d at 986-87.

Step One of the Two-Step Test

The first step of the two-step test for analogous art set forth in *Kahn* requires that the subject reference (*i.e.*, Uchino) be from the same field of endeavor as Appellants' invention. *Kahn*, 441 F.3d at 986-87.

Appellants' Specification and Swaminathan both disclose digital cellular telephone systems (FF 1 and 7). Appellants' Specification is concerned with generating comfort noise in a digital cellular telephone environment, and more specifically with matching comfort noise to the actual background noise in order to add a little noise during conversation to avoid changes in apparent loudness of speech during a call while making the comfort noise sound more natural (Spec. 1-2). Swaminathan is concerned with generating comfort noise in a digital cellular telephone environment (FF 7), and also is concerned with producing comfort noise that more closely matches the background noise in the call (FF 7). To the contrary, Uchino relates to the testing of a digital line (not during a call) by using a wander generator to generate white noise to test line response in a short measuring

time (e.g., phase noise, wander, jitter, etc.) (paras. 0002, 0003, and 0006; FF 5).

Although the Examiner is correct that Uchino and Swaminathan are both broadly directed to digital communications systems (Ans. 5 and 8), the systems of Appellants' invention and Swaminathan (digital cellular telephone communications system that generate a more natural sounding comfort noise), are divergent from the system of Uchino which generates and filters a white noise for purposes of testing a digital line. Thus, the first step of the two-step test for analogous art set forth in *Kahn*, requiring that the subject reference (i.e., Uchino) be from the same field of endeavor as Appellants' invention, is not met. *Kahn*, 441 F.3d at 986-87.

Step Two of the Two-Step Test

Step two of the two-step test for analogous art set forth in *Kahn* requires that one of ordinary skill in the art consider the subject reference (i.e., Uchino) to be reasonably pertinent to the problem with which the inventor was concerned.

Appellants are correct that Uchino is not reasonably pertinent to the problem faced by Appellants of providing improved and more natural sounding comfort noise in a digital cellular telephone environment (see FF 3). Uchino is concerned with generating a *test signal* to test a digital line using filter coefficients based on *fixed* amplitudes (see FF 5), and one of ordinary skill in the art faced with the problem of improving comfort noise characteristics would not have been reasonably expected to look to the test signal system and method of Uchino for help with generating a noise signal in a *cellular phone system* that varies in amplitude based on *varying* sub-band signal amplitudes in order to create a more natural comfort noise.

In other words, one of ordinary skill in the art would not have found Uchino's wander generator and test system reasonably pertinent to Appellants' problem of overcoming the disadvantages of noticeable comfort noise on a cellular telephone call, such as in the system and method of Swaminathan (*see generally* FF 2, 3, and 7). *Kahn*, 441 F.3d at 986-87. The ordinarily skilled artisan would not have found a QMF filter bank that generates a test signal which fluctuates along the power spectrum density distribution characteristic useful in overcoming the problem of producing a more natural comfort noise in a digital cellular telephone and speech signal environment encountered by Appellants and/or Swaminathan. Thus, step two of the two-step test for analogous art is not met.

For all of the foregoing reasons, the Examiner erred in determining that Uchino is analogous art and is therefore combinable with Swaminathan.

Appellants aptly state that "the rejection comes down to an assertion that it is obvious to generate comfort noise in the manner that the Uchino et al. publication generates test signals" (Br. 6). One of ordinary skill in the art, looking at Swaminathan's disclosure of a digital cellular telephone apparatus and method for generating comfort noise, which seeks to provide a comfort noise that more closely matches actual background noise (*see* FF 7), would not have found it obvious to follow Uchino's disclosure of generating a test signal to test a digital line using filter coefficients based on fixed amplitudes (*see* FF 5), to produce the result sought by the Appellants of providing an improved comfort noise generator which approximates spectral content of actual noise during a call by shaping white noise with a QMF filter bank according to a variable noise coefficient (*see* FF 1, 3 and 4).

Because Uchino and Appellants' claimed invention (and Swaminathan) are from divergent fields of endeavor and are not concerned with solving similar problems, Uchino is non-analogous art, and it would not have been obvious to combine Uchino with Swaminathan to achieve the claimed invention. Accordingly, the Examiner failed to establish a *prima facie* case of obviousness with respect to claims 1 to 10. *See Rijckaert*, 9 F.3d at 1532 (internal citations omitted) (stating that "the examiner bears the initial burden of presenting a *prima facie* case of obviousness"). In view of the foregoing, Appellants have shown that the Examiner erred in determining that Swaminathan and Uchino are combinable, and therefore teach or suggest the QMF feature which occurs in independent claims 1 and 6. The same holds true for all of the other dependent claims on appeal because they include the noted QMF feature.

The Examiner's conclusory statement that it would have been obvious to modify Swaminathan with Uchino "*in order to generate a noise signal that fluctuates along the power spectrum density distribution characteristic of the frequency fluctuations of the receive or transmit channel*" (Ans. 4 and 6) (emphasis added), does not constitute "articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR*, 127 S. Ct. at 1741. The Examiner has not provided a rational basis as to why the ordinarily skilled artisan concerned with comfort noise in a cellular phone environment would have looked to a test signal generator to solve the problem of filtering the comfort noise or making it seem more natural. We agree with Appellants that there is no basis for the combination (see Br. 5 and 7). Therefore, the Examiner has failed to provide a *prima*

facie case of obviousness with respect to claims 1 to 10. *See Oetiker*, 977 F.2d at 1445; *Bell*, 991 F.2d at 783.

Appellants' burden of demonstrating error in the Examiner's position with regard to claims 1 to 10 has been met. *See Kahn*, 441 F.3d at 985-86.

CONCLUSIONS OF LAW

For the foregoing reasons, Appellants have shown that the Examiner has not presented a rational basis for combining the digital communication system of Swaminathan with the test signal method and apparatus of Uchino as required by claims 1 to 10.

ORDER

We reverse the Examiner's obviousness rejections of claims 1 to 10 under § 103(a).

REVERSED

KIS

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